AMENDMENTS TO THE CLAIMS

Please amend claim 1 and add new claims 26-47 as set forth below. Withdraw claims 2-25 without prejudice or disclaimer.

The current listing of claims replaces all prior listings.

1. (Currently Amended) A nucleic acid ~~DNA plasmid~~ encoding a fusion protein comprising at least three domains configured as domain 1-GBP-domain 2, wherein the GBP domain comprises the amino acid sequence as set forth in SEQ ID NO:17, and wherein domain 1 and domain 2 are reactive with at least one binding moiety and/or substrate ~~all of, or a combination of the following components; a gold-binding polypeptide (GBP) that can have 1 to 7 repeats of the amino acid sequence: Met-His-Gly-Lys-Thr-Gln-Ala-Thr-Ser-Gly-Thr-Ile-Gln-Ser, wherein the last repeat can have an isoleucine substituted for a threonine in the fifth position; or a gold-binding peptide with a different amino acid sequence; one or more polypeptide fusion partners conferring specific activities to a fusion protein; repeating sequences of Gly-Ser of varying length to provide flexible linkers between fusion partners; specific affinity-binding sequence such as polyhistidine, or V5 epitope, or FLAG epitope, or the like to facilitate purification of fusion proteins; and specific peptide bonds that can be selectively hydrolyzed by enzymes or by chemical reactions~~.

2. (Withdrawn) The method of claim 1, wherein the DNA encodes GBP and a polypeptide fusion partner that has specific binding activity for another molecule; said fusion protein configured as polypeptide 1-GBP or GBP-polypeptide 1, and fusion partner domains separated by flexible linking sequences.

3. (Withdrawn) The method of claim 1, wherein the DNA encodes two or more copies of a distinct polypeptide fusion partner configured as polypeptide 1-GBP-polypeptide 1, and fusion partner domains separated by flexible linking sequences.

4. (Withdrawn) The method of claim 1, wherein the DNA encodes at least one copy of a distinct fusion partner and one copy of a different fusion partner configured as polypeptide 1-GBP-polypeptide 2 or polypeptide 2-GBP-polypeptide 1, and fusion partner domains separated by flexible linking sequences.

5. (Withdrawn) The method of claim 2, wherein the DNA encodes protein A, or protein G, or related molecule as a polypeptide fusion partner as in protein A-GBP or GBP-protein A.

6. (Withdrawn) The method of claim 2, wherein the DNA encodes streptavidin, or avidin, or related molecule as a polypeptide fusion partner as in streptavidin-GBP or GBP-streptavidin.

7. (Withdrawn) The method of claim 1, wherein the DNA encodes two or more copies of GBP as in GBP-GBP, or GBP-GBP-GBP etc, and the GBP domains are separated by flexible linking sequences.

8. (Withdrawn) The method of claim 3, wherein the DNA encodes at least one copy of protein A, or protein G, or related molecule fused to the amino-terminus of GBP and at least one other copy of protein A, or protein G, or related molecule fused to the carboxyl-terminus of GBP.

9. (Withdrawn) The method of claim 3, wherein the DNA encodes at least one copy of streptavidin, or avidin, or related molecule fused to the amino-terminus of GBP and at least one other copy of streptavidin, or avidin, or related molecule fused to the carboxyl-terminus of GBP.

10. (Withdrawn) The method of claim 4, wherein the DNA encodes at least one copy of protein A, or protein G, or related molecule and one copy of streptavidin, or avidin, or related molecule as polypeptide fusion partners as in protein A-GBP-streptavidin or streptavidin-GBP-protein A.

11. (Withdrawn) The method of claim 1, wherein the DNA encodes polypeptide fusion partners that are enzymes.

12. (Withdrawn) The methods of claims 1, 2, 3, and 11, wherein the DNA encodes the enzyme horseradish peroxidase (HRP) or related enzyme as polypeptide fusion partners as in HRP-GBP, or GBP-HRP, or HRP-GBP-HRP.

13. (Withdrawn) The methods of claims 1, 2, 3 and 11, wherein the DNA encodes the enzyme glucose oxidase (GOD) or related enzyme as polypeptide fusion partners as in GOD-GBP, or GBP-GOD, or GOD-GBP-GOD

14. (Withdrawn) The methods of claims 1 and 4, wherein the DNA encodes the enzyme horseradish peroxidase (HRP) or related enzyme, and the enzyme glucose oxidase (GOD) or related enzyme as polypeptide fusion partners as in HRP-GBP-GOD, or GOD-GBP-HRP.

15. (Withdrawn) The methods of claims 1 and 2, wherein the DNA encodes a polypeptide substrate or polypeptide inhibitor of a proteolytic enzyme as a fusion partner.

16. (Withdrawn) The method of claim 1, wherein the DNA encodes polypeptide fusion partners that are single-chain antibodies.

17. (Withdrawn) The method of claim 1, wherein the DNA encodes polypeptide fusion partners that are cell surface receptors, or other cell surface proteins, or ligands of cell surface receptors or proteins.

18. (Withdrawn) A method, wherein the DNA of claims 1 through 17 are expressed in bacteria, yeast, baculovirus, other microorganisms, plant cells, plants, mammalian cells or animals to produce stable and active fusion proteins containing GBP.

19. (Withdrawn) The method of claim 18, wherein the GBP-containing fusion proteins are purified by conventional means or using a polyhistidine sequence or other affinity tag sequence.

20. (Withdrawn) The method of claim 19, wherein purified GBP-containing fusion proteins are used in all fields that utilize gold.

21. (Withdrawn) The method of claim 19, wherein purified GBP-containing fusion proteins are used in biosensor or biodetection applications.

22. (Withdrawn) The method of claim 19, wherein purified GBP-containing fusion proteins are used to construct surface plasmon resonance sensors.

23. (Withdrawn) The method of claim 19, wherein purified GBP-containing fusion proteins are used to construct piezoelectric quartz crystal sensors.

24. (Withdrawn) The method of claim 19, wherein purified GBP-containing fusion proteins are used to construct amperometric electrodes.

25. (Withdrawn) The method of claim 19, wherein the produced GBP-containing fusion proteins are used in all applications utilizing colloidal gold.

26. (New) The nucleic acid of claim 1, wherein domain 1 and/or domain 2 is selected from the group consisting of protein A, protein G, streptavidin, core streptavidin, neutravidin, avidin, avidin related protein 4/5, strep-tag, strep-tag II, an antibody, an antibody fragment, a single chain antibody, biotin, an enzyme, a receptor, a peptide ligand, a polypeptide substrate, or a polypeptide inhibitor.

27. (New) The nucleic acid of claim 1, wherein domain 1 and/or domain 2 comprises one or more enzymes.

28. (New) The nucleic acid of claim 27, wherein the one or more enzymes are selected from the group consisting of oxidases, oxidoreductases, hydrolases, and dehydrogenases.

29. (New) The nucleic acid of claim 1, wherein the GBP domain comprises one or more repeated sequences as set forth in SEQ ID NO:17.

30. (New) The nucleic acid of 29, wherein the binding of the encoded fusion protein to a gold surface is unaffected by substitution of isoleucine for threonine in the fifth position of the last repeated sequence.

31. (New) The nucleic acid of claim 1, wherein the GBP domain comprises 1 to 7 repeated amino acid sequences as set forth in SEQ ID NO:17.

32. (New) The nucleic acid of claim 1, wherein each domain is separated by a polynucleotide encoding one or more peptide linkers.

33. (New) The nucleic acid of claim 32, wherein the linkers can be selectively hydrolyzed by enzymes or by chemical reaction.

34. (New) The nucleic acid of claim 32, wherein the linkers are of low complexity.

35. (New) The nucleic acid of claim 32, wherein the linkers are repeating Gly-Ser residues.

36. (New) The nucleic acid of claim 1, wherein domain 1 and domain 2 are the same.

37. (New) The nucleic acid of claim 1, wherein domain 1 and domain 2 are different.

38. (New) The nucleic acid of claim 1, further comprising a polynucleotide sequence encoding an affinity binding sequence.

39. (New) The nucleic acid of claim 38, wherein the affinity binding sequence is polyhistidine, V5 epitope, or FLAG epitope.

40. (New) The nucleic acid of claim 1, wherein the nucleic acid encodes the amino acid as set forth in SEQ ID NO:6.

41. (New) The nucleic acid of claim 1, wherein the nucleic acid encodes the amino acid as set forth in SEQ ID NO:8.

42. (New) The nucleic acid of claim 1, wherein the nucleic acid encodes the amino acid as set forth in SEQ ID NO:10.

43. (New) The nucleic acid of claim 1, wherein the nucleic acid encodes the amino acid as set forth in SEQ ID NO:12.

44. (New) The nucleic acid of claim 1, wherein the nucleic acid encodes the amino acid as set forth in SEQ ID NO:16.

45. (New) The nucleic acid of claim 1, wherein the nucleic acid is cloned into a vector.

46. (New) The nucleic acid of claim 45, wherein the vector is an expression vector.

47. (New) The nucleic acid of claim 46, wherein the vector comprises a host cell.